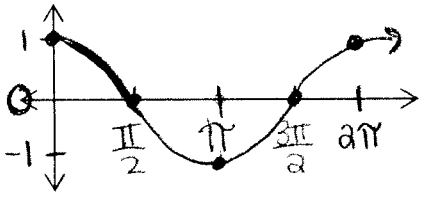
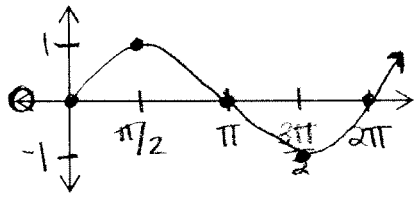
Algebra II Trig 13-6B Name Key

1. Graph at least one period of the following equations in radians.

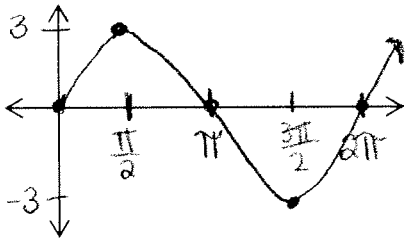
1. $y = \cos x$



2. $y = \sin x$

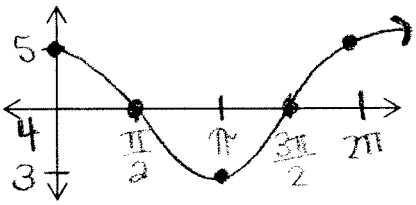


3. $y = 3 \sin x$



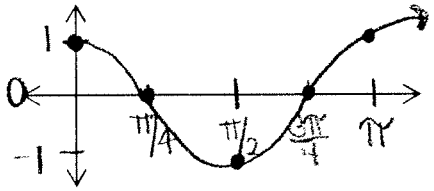
4. $y = 4 + \cos x$

cos x + 4



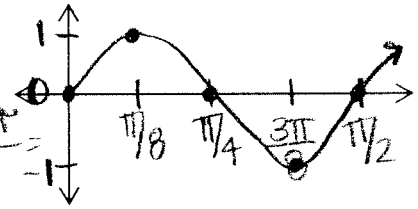
5. $y = \cos 2x$

Period $\frac{2\pi}{2} = \pi$



6. $y = \sin 4x$

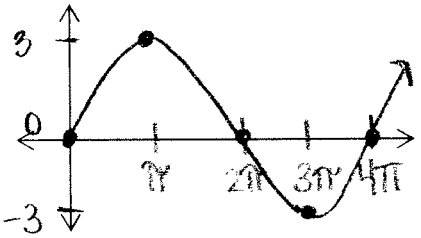
Period: $\frac{2\pi}{4} = \frac{\pi}{2}$



7. $y = 3 \sin\left(\frac{1}{2}x\right)$

Period: $\frac{2\pi}{1/2}$

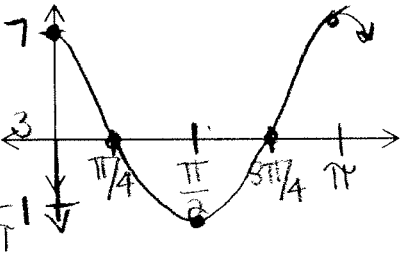
4π



8. $y = 3 + 4 \cos 2x$

$4\cos 2x + 3$

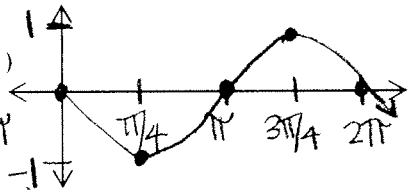
Period $\frac{2\pi}{2} = \pi$



9. $y = \sin(x - \pi)$

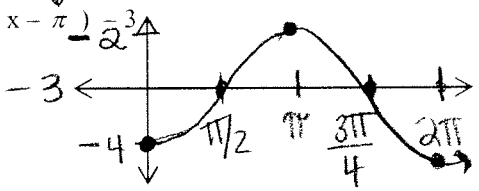
horizontal $+\pi$

treat π like 0



10. $y = \cos(x - \pi)$

horizontal $+\pi$

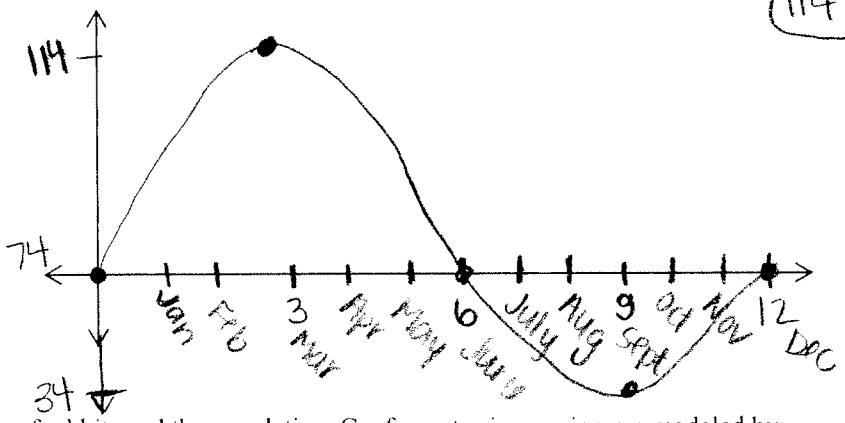


II. Problems

amp ↓ period $\frac{2\pi}{\pi/6} = 2\pi \cdot \frac{6}{\pi} = 12$

1. The sales of a seasonal product are modeled by the function $s(x) = 40 \sin\left(\frac{\pi}{6}\right)x + 74$, where s is thousands of units and x is the time in months (beginning with 1 for January). Identify the amplitude, period, and phase shifts of the function. Sketch a graph of the function for one period. What month shows the greatest number of units sold? How many?

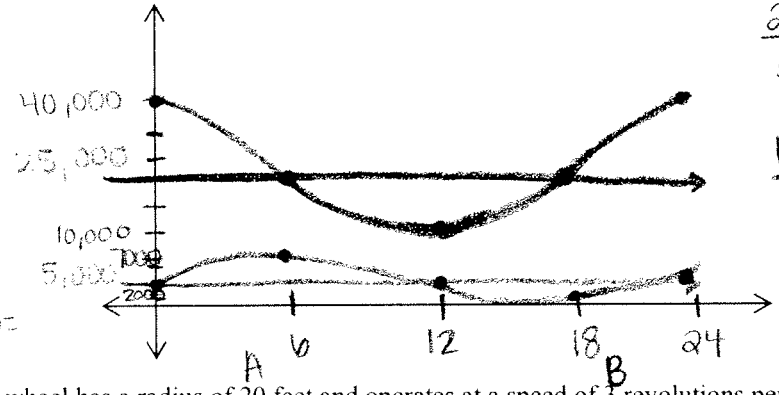
month 3 → March
114 items sold



2. The population, R, of rabbits and the population, C, of coyotes in a region are modeled by:

$R = 25{,}000 + 15{,}000 \cos\frac{2\pi}{24}$ and $C = 5000 + 2000 \sin\frac{2\pi}{24}$, where t is the time in months. Sketch both equations on the same graph. Find the maximum and minimum populations for each animal.

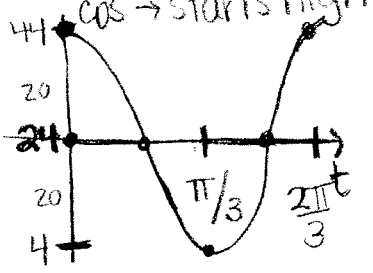
$\frac{2\pi}{\frac{2\pi}{24}} = \frac{2\pi}{1} \cdot \frac{24}{2\pi} = 24$



Coyotes:
max = 5,000 + 2,000
7,000
min = 5,000 − 2,000 =
3,000

Rabbits: max = 25,000 + 15,000
40,000
min = 25,000 − 15,000
10,000

3. A Ferris wheel has a radius of 20 feet and operates at a speed of 3 revolutions per minute. The bottom car is 4 feet above the ground. Write an equation for the height of a person above the ground whose height when t = 0 is h = 44.



$y = 20\cos(3x) + 24$

$\frac{2\pi}{3}$